

Inventions & Innovation Project Abstract

Hot Billet Surface Qualifier

OG Technologies, Inc. (OGT), with its industrial partners, plans to develop and demonstrate a prototype of a Hot Billet Surface Qualifier ("Qualifier") based on OGT's patented HotEye™ technology and other proprietary imaging and computing technologies. The Qualifier meets one of the R&D needs outlined in the Steel Industry Technology Roadmap to facilitate a close coupling of billet production and hot rolling. Such a close coupling could result in a simplified mill procedure, less working space, significantly reduced energy usage, and improved mill yield. This project matches EERE's mission to "reduce the energy intensity of industry" and thereby ease the shortage of natural gas. Most of the reheat furnaces, like many other furnaces used today in the North America industry, burn natural gas in order to meet the environmental protection requirements.

Surface inspection on the hot billets is a great technological challenge. Although hot metal surface inspection started to emerge lately, the environment of the casters or billet reduction mills, the billet geometry, natural billet surface condition and the typical defect locations make the currently available technologies not applicable without additional innovations. OGT plans to apply its innovations in imaging optics and image processing algorithms to develop and demonstrate the proposed Qualifier. The objective is to have a billet Qualifier with an accuracy of 90% or higher installed in a billet production line.

The proposed Qualifier, when installed in a billet mill, could enable a new industrial practice, in that the majority of the hot billets can be moved to the subsequent rolling operation (direct charge) with confidence in qualify. Only a small portion, about 15%, of the hot billets must be cooled down to room temperature for verification, surface grinding and reheat. This is different to the most common practice that all billets are cooled down to room temperature for inspection/surface grinding and reheat back to the working temperature. Each installation has the potential of 630,000 MMBTU in energy saving and 2.25% yield improvement per year. Extended benefits include the reduced emissions, reduced water usage and reduced mill scale.



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